

Individual factors associated with vulvovaginal candidiasis among non-pregnant women attending Hoima Regional Referral Hospital. A Descriptive cross-sectional study.

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Abstract

Background:

This study evaluated individual-level determinants of VVC among non-pregnant women attending Hoima Regional Referral Hospital.

Methodology:

A descriptive cross-sectional study involving 77 respondents was conducted using structured questionnaires. Data on medical history, hygiene practices, personal behaviors were collected and analyzed using descriptive statistical methods.

Results:

Most of the respondents, 20(30%), were aged between 30 and 39 years, whereas the least, 10(13%), were above 50 years. Most 39(50.6%) of the respondents were married, whereas the least 5(5.6%) were widowed. Most 37(48.1%) of the respondents had a secondary school level of education, while the least 5(6.5%) had no formal level of education. 26(33.8%) of the respondents were self-employed, whereas the least 8(10.4%) of them were just employed. About 57(74%) of the respondents lived in rural areas while the least 20(26%) lived in urban areas

Of the respondents diagnosed with VVC (46.8%), a significant proportion (63.9%) reported having chronic illnesses, particularly diabetes, which compromises immune function and increases infection risk. Regarding recurrence, 77.8% experienced at least one yeast infection within the past 12 months, indicating a high recurrence rate. Hygiene practices revealed mixed patterns; while 55.6% reported changing underwear daily, potentially protective, 38.9% engaged in vaginal douching or used feminine hygiene sprays, practices known to disrupt normal vaginal microbiota. Symptomatically, 72.7% reported classic signs such as itching, burning sensation, and abnormal discharge, confirming active infection. These findings demonstrate that both physiological vulnerabilities and modifiable behaviors significantly contribute to VVC occurrence and persistence.

Conclusion:

Individual health status and behavioral practices play an important role in the occurrence and recurrence of vulvovaginal candidiasis. Chronic illnesses such as diabetes and certain hygiene practices can increase the risk of infection.

Recommendations:

Health education should emphasize proper genital hygiene and discourage harmful practices like douching.

Keywords: Vulvovaginal candidiasis, chronic illness, personal hygiene, behavioral factors, women's health.

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Background

Candidiasis is a fungal infection primarily caused by *Candida albicans*, an opportunistic and polymorphic fungus characterized by vaginal itching, burning, and a thick, white, lumpy discharge, sometimes resembling cottage cheese. Candidal vulvovaginitis results from inflammatory changes in the vaginal and vulvar epithelium due to *Candida* species, most commonly *Candida albicans*. While *Candida* is a normal part of the flora in many women, found in 10% of

asymptomatic individuals, Vulvovaginal candidiasis (VVC) requires the presence of *Candida* along with associated symptoms, such as irritation, itching, dysuria, or inflammation (Jeanmonod et al., 2025).

Globally, nearly 5–10 million females seek gynecologic advice for vaginitis every year. Women of childbearing age estimate that approximately 70–75% will have at least one episode of VVC during their lifetime, and 40–50% will suffer recurrence. Recurrent VVC worldwide affects

approximately 138 million women annually, ranging from 103 to 172 million, with an annual prevalence of 3871 per 100,000 women worldwide; 372 million women are affected by recurrent VVC over their lifetime (Hussen et al., 2024). In India, studies found that the prevalence of laboratory-confirmed VVC among adult women in the reproductive age group ranges from 10% to 35%(Seth et al., 2022).

Southeast Asian studies found that women have an estimated prevalence of 23.0% for VVC(Falcon et al., 2024). In Sub-Saharan Africa(SSA), the estimated prevalence of Vulvovaginal candidiasis was 33%(Abdouramane, 2023). In Cameroon, according to the studies, 34.8% of women were found to have vaginal candidiasis(Kamwiziku et al., 2021).

In Africa, according to the studies, the occurrence of *Candida albicans* was recorded at 6.5%, with approximately two-thirds of women experiencing at least one episode in their lifetime and nearly 50% going on to have multiple episodes(Emeribe et al., 2015).

One of the most critical individual-level determinants is the presence of underlying medical conditions such as diabetes mellitus and immunosuppression. Poor glycemic control enhances glucose availability in vaginal secretions, promoting fungal proliferation, while weakened immunity reduces the body's ability to regulate *Candida* growth. Similarly, women living with conditions such as HIV face increased susceptibility due to compromised immune defences. These biological factors demonstrate that VVC is not solely an infection but also a manifestation of systemic health status.

Hormonal influences also play a central role in the development of VVC. Elevated estrogen levels, whether from endogenous sources or hormonal contraceptives, have been associated with increased glycogen deposition in vaginal epithelial cells, which provides a favorable environment for *Candida* multiplication. Even among non-pregnant women, the use of oral contraceptives and hormone therapies has been identified as a significant predisposing factor. This highlights the importance of reproductive health choices in shaping susceptibility to infection. (Duerr et al., 2003)

This study, therefore, determined the individual factors associated with Vulvovaginal candidiasis among non-pregnant women attending the gynecology clinic at Hoima regional referral hospital in Hoima City.

Methodology

Study Design and Rationale

The research utilized a cross-sectional descriptive study design to collect data at a single point in time without following up on participants. It was suitable because it allowed simultaneous collection of data on exposure and outcome at the same time, which improved authenticity.

Study area

The study was conducted at Hoima RRH because it was convenient and easier for me. It is located in Hoima city, approximately 198 kilometers by road from Kampala, Uganda's capital city, offering specialist services with a bed capacity of about 250 beds. It is a Regional Referral Hospital with different departments such as surgical, medical, pediatrics, obstetrics and gynecology, and mental clinic serving a population of about 3.5 million across eight districts, including Kakumiro, Kagadi, Kikube, among others.

Study population

The study involved non-pregnant women aged 15-40 years attending the gynecological clinic at Hoima RRH, who willingly gave consent and provided information on their views on the factors associated with the prevalence of Vulvovaginal candidiasis.

Sample size determination

The sample size was determined using the Kish-Leslie 1965 formula

$$Z^2pq/d_2$$

n = sample size required

Z= the statistical certainty 1.96(For 95% confidence interval)

P = estimated prevalence of VVC was 27.70% among non-pregnant women(Mtende et al., 2024a). q=1-p d=Margin of error set at 5% $n = (1.96)^2 * 0.277 * (1 - 0.277) / 0.05^2$ n= 307.744 n~308/4 n=77

Therefore, 77 respondents will take part in the study

Sampling Technique and Rationale

A systematic random sampling method was used in which respondents were chosen at random without any bias in the selection of individuals to participate in the study.

Sampling procedure

The author visited Hoima RRH, identified the hospital in charge, and discussed the study topic. After approval by the In-Charge to proceed with the study, using a systematic random sampling technique, the author chose every 10th mother in the age group of 15-45 years who was attending the gynecological clinic that day until a total of respondents was attained. This was repeated on a daily basis for a period of two weeks until a total of 80 participants was reached.

Data collection method and rationale

The data was collected using an author-administered semi-structured questionnaire to collect data on the factors associated with VVC among non-pregnant women attending the gynecological clinic at Hoima RRH. The questionnaire was used because it ensured a high response rate, time

saving, and required less energy to use, as data collection was concerned.

Data collection tools

The data collection process involved the use of semi-structured, self-administered questionnaires with closed-ended questions that were specifically designed to meet the objectives of the study. The questionnaires were written in a simple and straight forward to ensure they are easily understood by both literate and illiterate mothers who participated in the study. Assistance was given to those participants who were unable to read by the author.

Data collection procedures.

The questionnaires were distributed in person to the participants who agreed and consented to be part of the study. Clear guidelines and instructions were given to the participants on how to fill out the questionnaires, and after filling out the questionnaires were collected to monitor the responses.

Piloting the study

The author conducted a pilot study in Hoima RRH, visiting the study area a week before conducting the actual research to seek and obtain permission from the hospital administration. This visit was aimed at ensuring that the conditions at the hospital had not changed and ruled out the presence of highly infectious diseases that could have hindered the research in the hospital.

Pre- testing of the study tools

The author pre- tested the questionnaire using a small number as compared to the estimated study population, which was 25 patients at Hoima RRH, before the actual data collection, so that in case of need, changes could be made before the actual data collection, so as to ensure information collected was valid and reliable.

Inclusion criteria

The study included all non- pregnant women aged 15years and above who were available at the hospital and consented to participate in the study.

Observation of SOPs

This will involve hand hygiene, social distancing, and hand rubbing to prevent cross-infection and ensure the hospital operating procedures are observed, and avoid hindrance of any hospital activities due to research.

Data Management and Analysis

After collecting data, it was checked for completeness, clarity, and accuracy. Those that were severely incomplete, with a lot of jargon and abbreviations, were disposed of, and the well-filled and completed questionnaires were collected, and the data were manually analyzed using statistical tally sheets and then entered into a computer using Microsoft Excel software. The findings were presented in the form of tables and graphs, including bar charts and line graphs, using Microsoft Excel 2019.

Ethical considerations

On approval by the Mildmay Institute of Health Sciences research committee, written permission to conduct the research study was obtained from the principal school of clinical medicine, introducing me to the medical superintendent of Hoima Regional Referral Hospital, who, in turn, authorized me by authenticating my introductory letter from the Principal of the School of Clinical Medicine, Mildmay Institute of Health Sciences.

The consent of the participants was sought with informed written consent before the study was conducted. I gave a full explanation of the research procedures to the participants, ensuring they understood it. Consent forms were used to seek written consent before interviewing. The information given was kept confidential, and the names of the participants were not included in the report. The participation was voluntary, and one was free to withdraw from the study at any time without any punishment or loss of benefit.

Results

Socio-demographics of the study participants

Most of the respondents, 20(30%), were aged between 30 and 39 years, whereas the least, 10(13%), were above 50 years. Most 39(50.6%) of the respondents were married, whereas the least 5(5.6%) were widowed. Most 37(48.1%) of the respondents had a secondary school level of education, while the least 5(6.5%) had no formal level of education. 26(33.8%) of the respondents were self-employed, whereas the least 8(10.4%) of them were just employed. About 57(74%) of the respondents lived in rural areas, while the least 20(26%) lived in urban areas. Most 30(39%) of the respondents' household income was between 10,000 and 50,000, whereas the least 7(9.1%) of them had a household income of more than 100,000

Table 1: Shows socio-demographics of the study participants, N=77

Variable	Category	Outcome n (%)
Age Group	15–20	15(19.5)
	20–29	18(23.4)
	30–39	20(30.0)
	40–49	14(18.2)
	50 and above	10(13.0)
Marital Status	Single	20(30.0)
	Married	39(50.6)
	Widowed	5(6.5)
	Separated	13(16.9)
Education Level	No formal education	5(6.5)
	Primary school	25(32.5)
	Secondary school	37(48.1)
	Tertiary/University	10(13.0)
Occupation	Unemployed	20(26.0)
	Student	23(29.9)
	Self-employed	26(33.8)
	Employed	8(10.4)
Residence	Rural	57(74.0)
	Urban	20(26.0)
Monthly Household Income	Less than 10,000	25(32.5)
	10,000–50,000	30(39.0)
	50,000–100,000	15(19.5)
	More than 100,000	7(9.1)

Individual factors associated with vulvovaginal candidiasis among non- pregnant women attending antenatal care.

Table 2: Shows individual factors associated with vulvovaginal candidiasis among non-pregnant women attending antenatal care. N=36

Variable	Category	Outcome, n (%)
Frequency of yeast infection in the past 12 months	Once	28(77.8)
	Twice	5(13.9)
	More than twice	3(8.3)
Current chronic illnesses associated with the relapse of VVC	Yes	23(63.9)
	No	13(36.1)
If yes (n = 23): Number of VVC relapses in past 12 months	Once	12(52.2)
	2–3 times	8(34.8)
	More than 3 times	4(17.4)
Frequency of changing underwear	Daily	20(55.6)
	More than once weekly	10(27.8)
	Less frequently	6(16.7)
Use of vaginal douches or feminine hygiene sprays	Yes	14(38.9)
	No	22(61.1)

Table 2 shows that 28 (77.8%) of the respondents reported that they had only one yeast infection in the past year, while at least 3 (8.3%) reported having more than two yeast infections within the same period. More than half 23, 63.9%) of the respondents reported that they currently had chronic illnesses associated with relapses of VVC in the past 12 months, while 13 (36.1%) reported that they did not have any such chronic illnesses. Among the respondents who had chronic illnesses, most 12 (52.2%) reported experiencing

VVC once, whereas the least 4 (17.4%) indicated that they experienced the infection more than three times during the past 12 months. The table also shows that most respondents, 20(55.6%), reported changing their underwear daily, whereas the least, 6(16.7%), reported that they changed their underwear less frequently. More than half of the respondents, 22 (61.1%), reported that they did not use vaginal douches or feminine hygiene sprays, while 14 (38.9%) reported that they did use them.

Figure 1: Shows respondents' responses on whether they experienced symptoms such as Itching, burning, or abnormal discharge regularly. N= 36

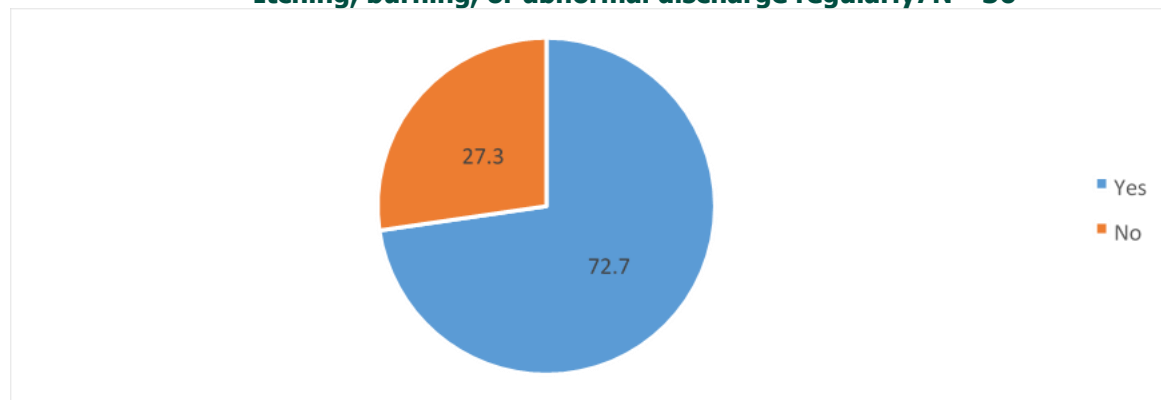


Figure 1 shows that 26(72.7%) reported that they experienced symptoms such as itching, burning, or abnormal discharge regularly, whereas at least 10(27.3%) of them reported that they did not experience the symptoms at all.

Discussion

Socio-demographic factors associated with vulvovaginal candidiasis among nonpregnant women attending the gynaecological unit.

Regarding the response on the respondent's age, 14(38.9%) of the respondents were between the ages of 30 and 39 years. This implies that most of the respondents were in that age group. This is because women in this age range are more likely to actively utilize healthcare services and are often more health-aware. These results are in agreement with the study findings according to (Bitew & Abebaw, 2018) about the social demographic factors associated with VVC which found out that participants in the age group of 25 years and older was between 40.0% and 44.8%, implying that women in this age group are at higher risk due to increased reproductive and healthcare-seeking activities, and therefore strengthening targeted health education for women above 25 years could help reduce this risk.

About respondent's response on their marital status, most 52.8% of them reported that they were married. This implies that most of the respondents were staying with their spouses in a stable marriage. This is because married women tend to engage more frequently with healthcare services for reproductive and family-related needs. These findings are not in agreement with the study findings, according to Edem et al. (2021), about the socio- demographic factors associated with

VVC among non-pregnant women who found out that married females had a higher incidence of VVC of 31.9%. This indicates that marital status influences VVC risk due to factors like sexual activity and partner transmission, and a possible solution is to enhance targeted sexual health education and promote consistent use of protective measures among married women.

From the respondents' responses on whether their occupation, most 44.4% of them reported that they were self- employed. This indicates that most of the respondents had an activity that could bring them some income. This is because self-employment is common in settings where formal job opportunities are limited, forcing individuals to rely on small businesses and informal work to sustain their livelihoods. These findings are not in line with the study findings by (Chopra et al., 2025) about the socio-demographic factors associated with VVC, which identified

that 57.1% were in the lower class and had financial constraints, therefore were not employed. This implies that financial constraints may limit women's ability to access proper hygiene and timely medical care, thereby increasing their risk of VVC, and strengthening community-based support programs that provide affordable reproductive health services could help address this challenge.

Regarding the response on the respondent's level of education, most 44.4% of them had secondary school level. This indicates that most of them stopped at the secondary school level, and this was due to limited access to higher education opportunities, financial constraints, or the need to enter the workforce early to support their families. These findings are not in line with the results according to (Chopra et al., 2025) about the socio-demographic factors associated with VVC, which found that only 16.0% had secondary education. This suggests that lower educational attainment may limit women's understanding of hygiene practices and VVC prevention, increasing their susceptibility to infection; therefore, implementing community-based reproductive health education and awareness campaigns could help bridge this knowledge gap and reduce the incidence of VVC among women with secondary education.

Individual factors associated with vulvovaginal candidiasis among non-pregnant women attending a gynecological clinic.

Regarding the responses of respondents on whether they currently had any chronic illness associated with the relapse of VVC in the past 12 months, more than half 63.9% reported that they did have a chronic illness. This indicates that more than half of the respondents had chronic illnesses like diabetes that were associated with the relapses of their VVC. This is because chronic illnesses like diabetes mellitus cause hyperglycemia, which impairs immune function, enhances *Candida* virulence, and creates an environment favorable for yeast proliferation, leading to increased risk and recurrence of VVC infections among affected women. These results are not in line with the study findings according to Arfiputri et al. (2018) about Risk Factors of Vulvovaginal Candidiasis in Dermato-Venereology Outpatients Clinic of Soetomo General Hospital, which found that diabetes mellitus was present in approximately 20% of the women with VVC. This indicates that diabetes mellitus among VVC patients significantly compromises immune function and increases the risk and severity of VVC infections. Therefore, a possible solution is glycemic control combined with appropriate antifungal treatment to reduce infection frequency and improve patient outcomes.

About their response on how frequently they changed their underwear, most 55.6% of respondents reported that they changed their underwear daily. This indicates that most of the respondents changed their underwear on a daily basis. This is because it is generally considered a hygienic practice.

Regular changing of underwear helps prevent the buildup of sweat, bacteria, and odor, which can contribute to better personal hygiene and overall health. These results are not in line with the study findings according to Bitew & Abebaw (2018) about Vulvovaginal candidiasis: species distribution of *Candida* and their antifungal susceptibility pattern. The findings showed that 33.6% of participants who changed their underwear more frequently (two pairs per day) had VVC. This implies that frequent underwear changing alone does not adequately reduce VVC risk and must be complemented by broader genital hygiene and preventive practices; therefore, women should combine regular underwear changes with breathable cotton fabrics, proper drying, and avoidance of moisture-retaining clothing to better prevent VVC.

Regarding their response on how frequently they had the yeast infection for the past 12 months, 52.2% of the respondents reported that they had only one yeast infection in the past 12 months. This indicates that most of the respondents did not have a relapse of the yeast infection. This is because most of the respondents were not repeatedly exposed to known relapse-triggering factors such as chronic stress, uncontrolled blood glucose, or frequent antibiotic use. These results are not in line with the study findings according to Zeinab Moshfeghy, (2020) about Association of sexual function and psychological symptoms including depression, anxiety and stress in women with recurrent vulvovaginal candidiasis, were results found out that 75% of women had vaginal yeast infection at least once in their lifetime and stressful life events may lead to the disease by inhibiting the immune system of individuals implying that psychological stress is a key risk factor, so women should manage stress through exercise, relaxation techniques, adequate sleep, and counseling alongside good genital hygiene to reduce VVC risk.

Conclusion

Individual health status and behavioral practices play an important role in the occurrence and recurrence of vulvovaginal candidiasis. Chronic illnesses such as diabetes and certain hygiene practices can increase the risk of infection.

Recommendations

Promote health education on proper genital hygiene.
Encourage screening and management of chronic diseases such as diabetes.
Discourage harmful practices such as excessive vaginal douching.

Study limitation

The study was limited by failure to communicate effectively with the non-pregnant mothers due to a language barrier. It was also influenced by the non-pregnant mothers' failure to give meaningful information due to the need for payment.

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List of Abbreviations

CDC: Centre for Disease Control
COCP: Combined Oral Contraceptive Pills
HIV: Human Immunodeficiency Virus
HPA: Hypothalamic-Pituitary-Adrenal
ICU: Intensive Care Unit
NCA: Non Candida Albicans
NGO's: Non-Government Organizations
RRH: Regional Referral Hospital
USAID: United States Agency for International Development
UTI: Urinary Tract Infections
VVC: Vulvovaginal candidiasis
SOPS: Standard Operating Procedures

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Conflict of Interest

The authors declare no conflict of interest regarding the publication of this study.

Author Contributions

The primary author designed the study, collected and analyzed the data, and prepared the manuscript. The research supervisor provided methodological guidance, reviewed the manuscript, and approved the final version for submission.

Data Availability

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Ethical Approval

Ethical approval for the study was obtained from the research committee of Mildmay Institute of Health Sciences, and permission was granted by the Hoima Regional Referral Hospital administration before data collection.

Informed Consent

Written informed consent was obtained from all participants prior to participation in the study. Participation was voluntary, and the confidentiality of all respondents was maintained throughout the study.

Author Biography

Mukonyezi Vincent is an author in reproductive and women's health with an interest in infectious diseases affecting women of reproductive age. His research focuses on improving the prevention, diagnosis, and management of reproductive tract infections in low-resource settings.

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